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INFORMATION REPORT

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COUNTRY	USSR (Moscow Oblast)	REPORT	
SUBJECT	Designing of Radio Tube Production Machinery at Institute 160, Fryazino	DATE DISTR.	7 December 1953
		NO. OF PAGES	14
DATE OF INFO.		REQUIREMENT	
PLACE ACQUIRED		REFERENCES	

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NO. OF ENCLS. (LISTED BELOW)

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DATE ACQUIRED BY SOURCE :

SUPPLEMENT TO REPORT NO.

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1. the OKBM (Construction Office for Machinery Design) office of Institute 160 in Fryazino.

2. a centrifuge that was to be used for testing radio tubes under accelerational and "G" forces. This machine was of standard design, waist high, and with a rotating disc approximately 18 inches in diameter. Its speed could be regulated by changing the ratio of a belt drive. another centrifuge that was larger and incorporated a safety device that only allowed the machine to operate when a protecting lid was lowered over the rotating disc. This machine had a variable speed control utilizing a worm gear arrangement. approximately 12 tubes could be tested at one time in either of these machines, and that the first machine was for laboratory use while the latter was a production model.

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3. a brazing furnace, Its rating was approximately 10 kw. Heat was supplied by resistance coils of either tungsten or molybdenum. The operating chamber temperature was 1100°C, and pure hydrogen gas was used for the controlled

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atmosphere.

4. a simple, standard type, resistance-heating smelting oven. Following this another smelting oven was designed for use in melting down a metal known as "germanium." The latter oven used induction heating to melt metal held in a carbon crucible [see page 5]. The smelting process took place in a high vacuum sealed off by a water-cooled chamber. Later, still another oven was designed using the same principle, only it consisted of four chambers with only one set of induction coils that could be lowered over each chamber in turn. This utilized the one induction coil continuously while loading and emptying the other chambers.

5. a machine, supposedly based on an idea gotten from an American publication. [See pages 6, 7 and 8.] This machine was used to fuse the face of a television picture tube onto its base. A resistance heating oven preheats the glass and then two high-frequency electrodes swing into position and by induction heat fuse the seam.

6. Another designs was that of a simple, standard type oven for use in subjecting radio tubes to various controlled temperature tests.

7. a modification of an American (RCA) machine used to fabricate the electrode pins that pass through the base of a radio tube. The modification was to change the machine so as it would "pull" off rather than "shear" off, from a continuous wire, short lengths of wire that the machine automatically butt welds to two other pieces of wire stock. The need for this change was to eliminate the operation of rounding off the sheared end of wire stock that had to be fitted into a tube socket. Temperature of the wire stock was 900° C when it was pulled apart. The material was a nickel wire with copper coating "Plantinite." The rate of production on this machine was approximately one completed pin each second. This project was completed in 1951.

8. an automatic radio tube exhaust machine for use on miniature tubes. This machine [see pages 9,10, 11 and 12.] was designed after a German make (Brueckner-Lorenz*). The principal modification was to change the machine from operating on a continuous cycle to a 16-stage cycle. This was done by use of a "drum" and "follower" [see page 13]. A second modification was to substitute the gear drive with a "V" belt and step-pulleys which afforded three speeds, the lowest speed turning out one tube each 12 seconds and top speed one each six seconds. The machine was hand fed and operated by one person. The highest vacuum this machine could attain was 10^{-5}

9. a conveyor that was to use the "dip" process for cleaning radio tube parts. The cleaning fluid was a mixture of alcohol and water that was to be removed by drying in an oven. what type of tube parts it was to handle.

10. a conveyor for dipping television picture tubes into some type of paint mentioned at NII 160,

*Semi-automatic

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a centrifuge to spread, under centrifugal force, a fluorescent material over the inner surface of television picture tubes

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11. Also mentioned were the following projects:

a. High frequency work.

b. Designing of electrical measuring instruments such as volt and ampere meters.

c. A radio tube glass sealing machine.

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12. Regarding materials and machines at NII 160, all high vacuum pumps were of the oil type (oil specifications). Some were American made and the rest were German reparation material. Only the American pumps were copied, and the capacity of these rated at five meters/second. The largest machine was a 36-head German machine (Telefunken).

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13. There was no shortage of bearings of any type.

14. Forgings were never specified in the designs because only a few machines were to be built from one design.

15. The engineers were never asked to utilize any used or stock parts in their specifications.

16. eight radio tube exhaust machines in the tube production shop and all were German reparation machines (Brueckner-Lorenz).

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17. Once in 1949 the engineers were told to use as little phosphor copper as possible.

18. Castor oil was the lubricant used on radio tube stems prior to inserting them into the compression rubbers of the exhaust machines.

19. no new metal alloys in use at Institute 160 that are not common to all industry today.

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20. no vacuum pumps were ever designed at Institute 160, and that all those in use were either of German or American make or copies of the American type.

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21. All design specifications at OKBM met ISA (International Federation of National Standarizing Association) standards.

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22. No special markings, symbols or abbreviations were used on any drawings. All drawings were inked. All dimensioning was in the metric system.

23. to specify any materials normally used in machine fabrication. the Soviets were capable of manufacturing any part specified, only in many cases it might necessitate very crude and time-consuming methods.

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24. drawings once they were turned over to the shop and none were ever changed the Soviets modified some of the designs during fabrication,

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25.

26. The shop that manufactured machinery worked on a "job shop" basis and only the standard machine tools were available. 50X1-HUM

27. In the radio tube production shop there was no use of conveyors or multi-rack dollies. Nearly all transporting of tubes was done by hand. Some of the smaller tubes were held in crude wooden racks, but only at points where a rapid operation took place. 50X1-HUM

28. a load of large rectifier tubes placed on a truck. This was the only time any shipment of any nature at Institute 160. The destination of this shipment is not known. 50X1-HUM

29.

30.

31. All designing of machinery at the Institute was done in the OKBM office. There was no mass production of machinery at Institute 160, and only three or four machines of each type were ever produced.

32. There were never any due dates imposed on any projects. 50X1-HUM

33. The only other Soviet vacuum tube machinery plant is the Svetlana plant near Leningrad.

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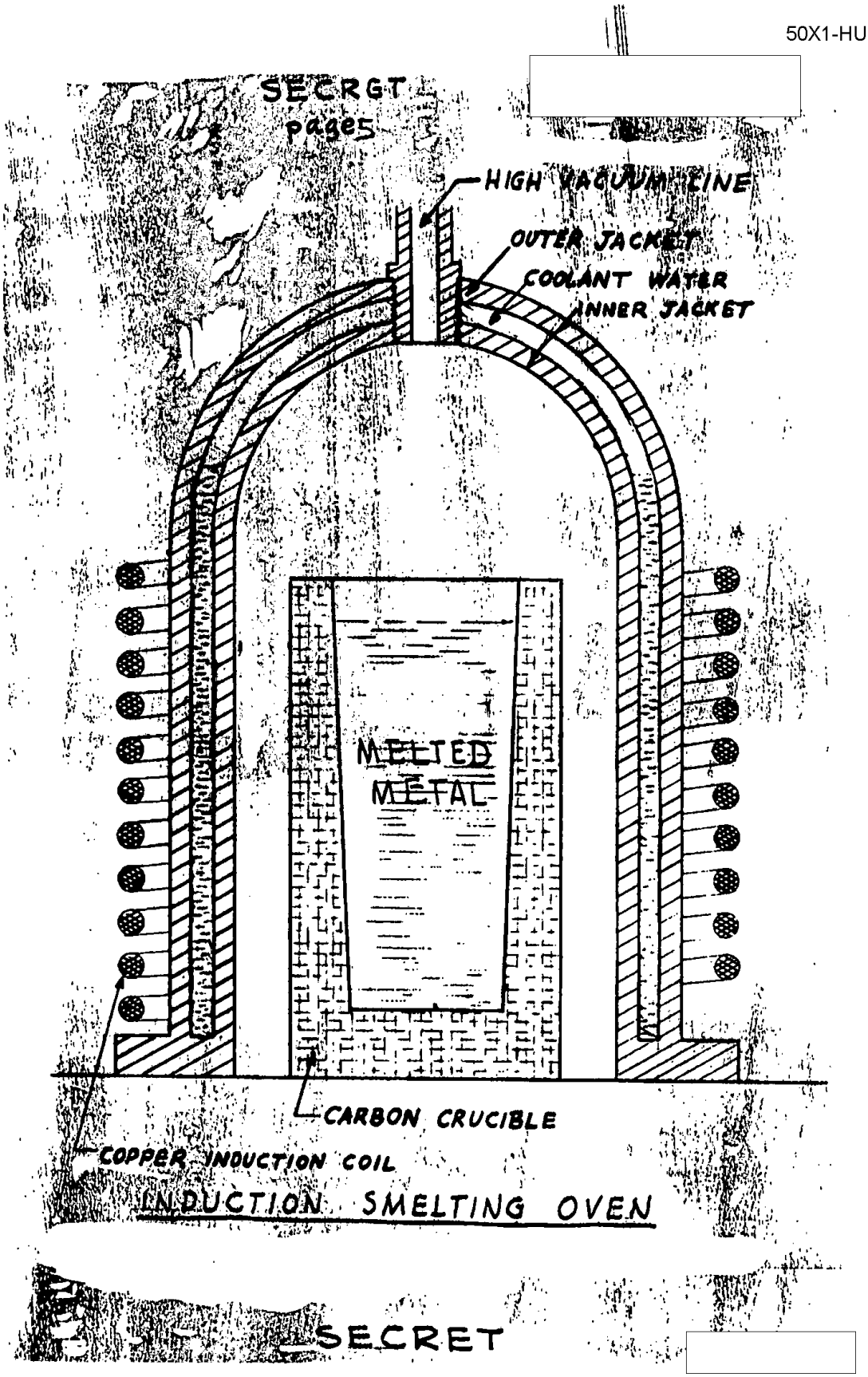

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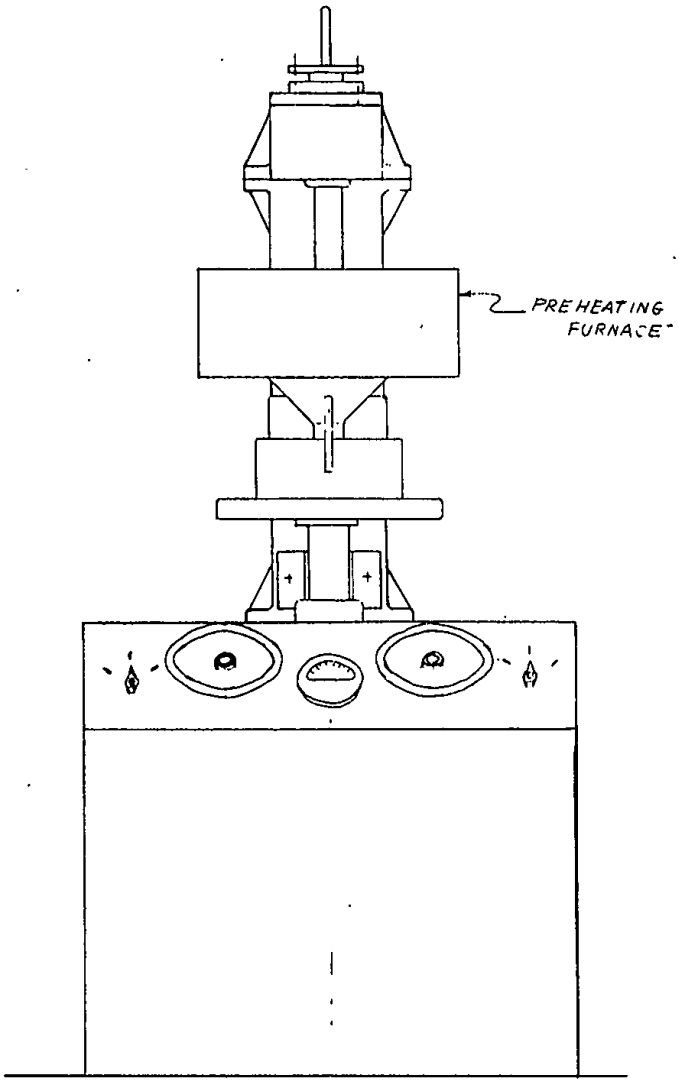

Glass Fusing Machine for TV
Picture Tubes (Front View)

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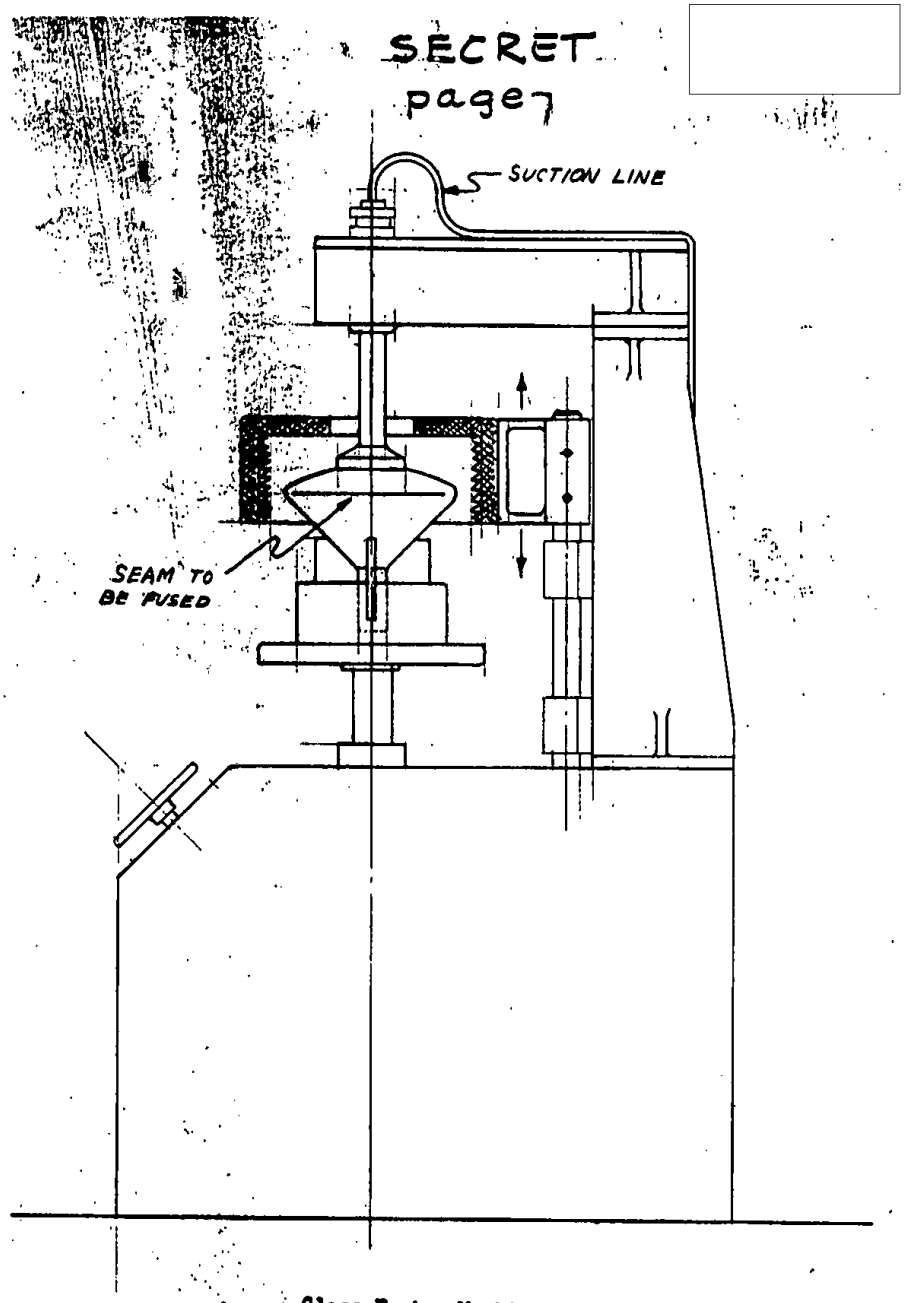
page 7



Glass Fusing Machine for
TV Picture Tubes (Side View)
(Swinging Electrode Arm Not Shown)

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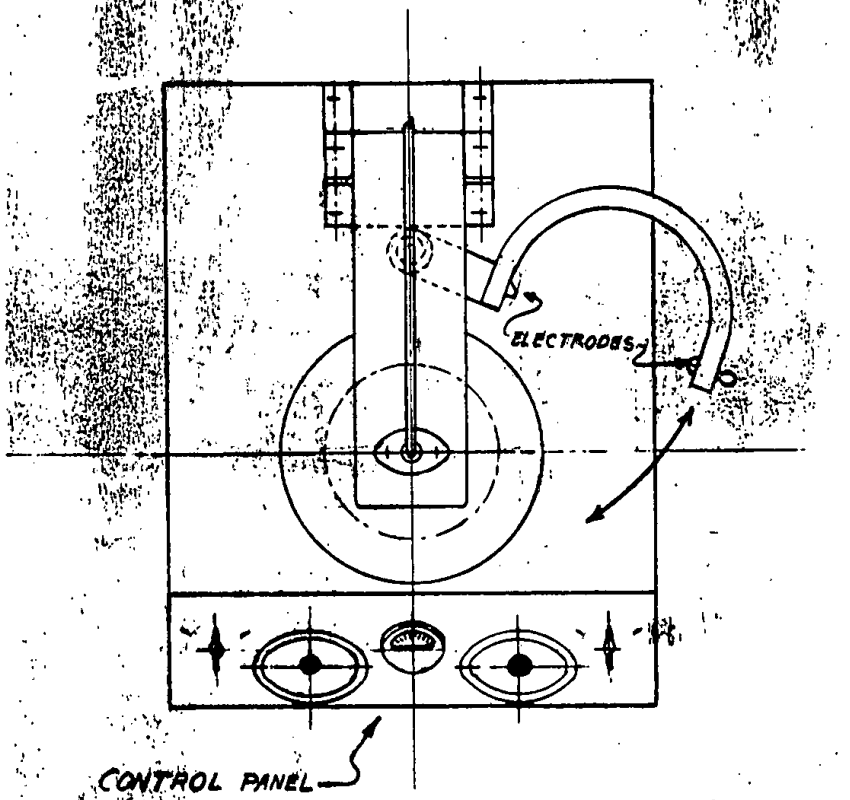
page 8



Glass Fusing Machine for TV Picture Tubes (Top View)

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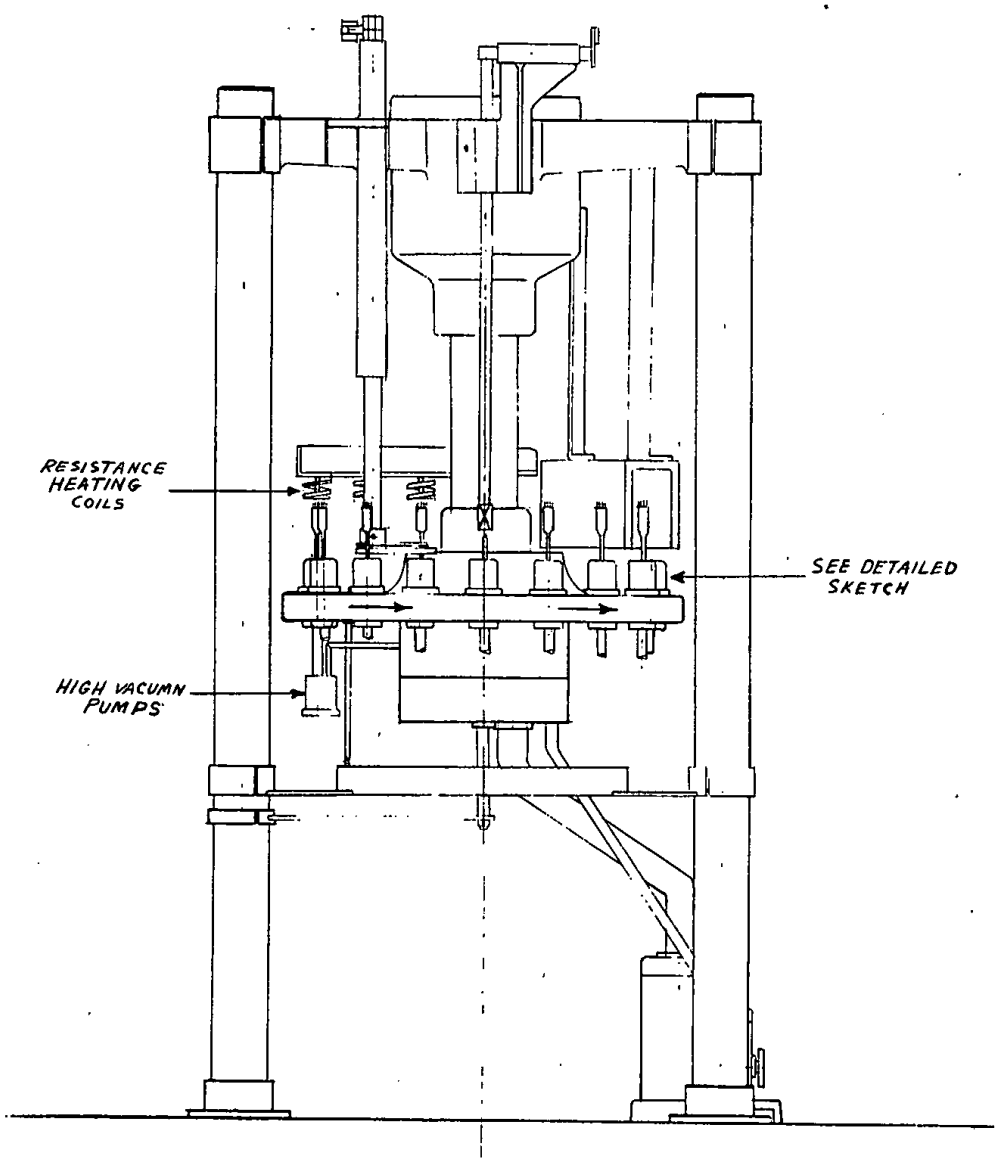

Modified Exhaust Machine (Front View)

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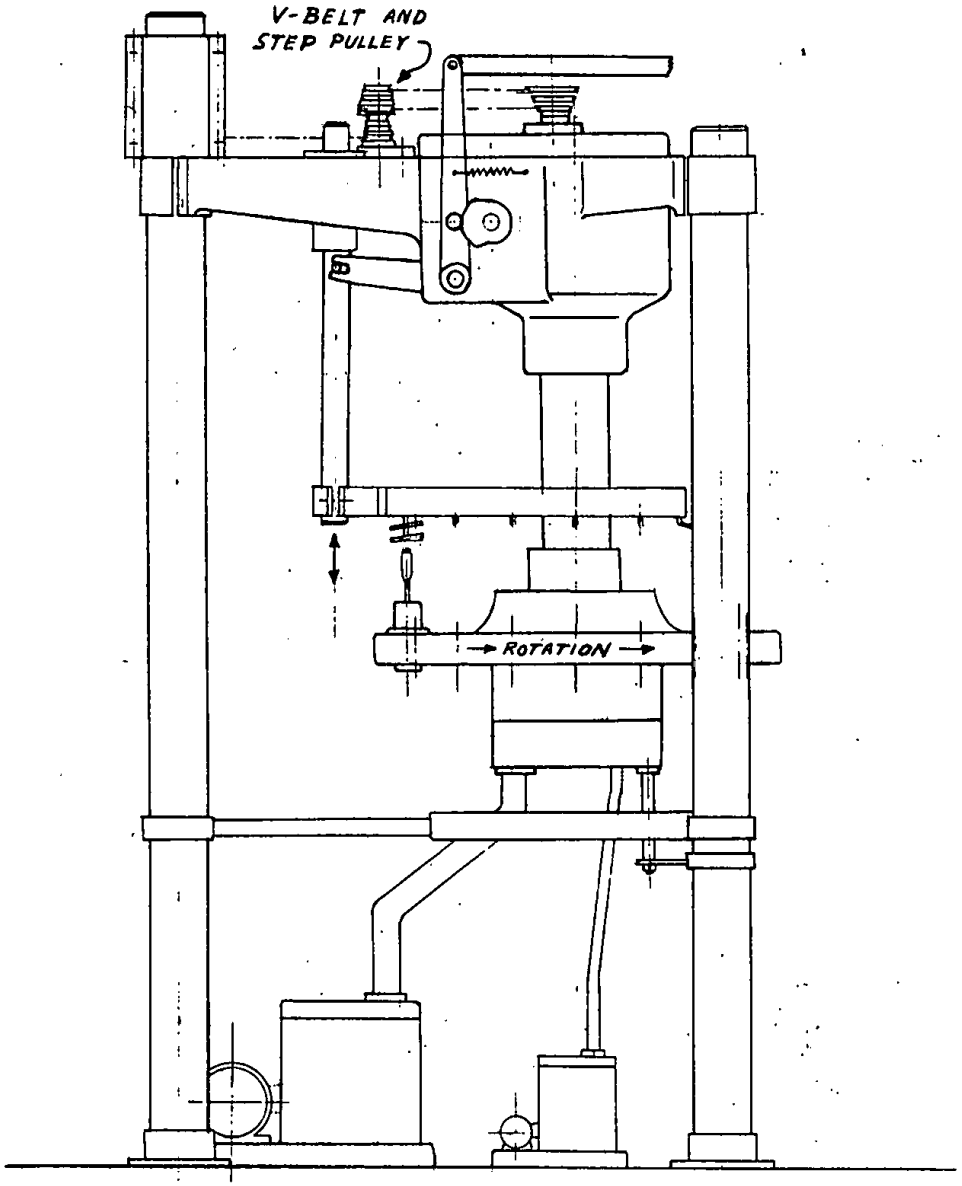
50X1-HUM

SECRET

page 10



Modified Exhaust Machine (Side View)

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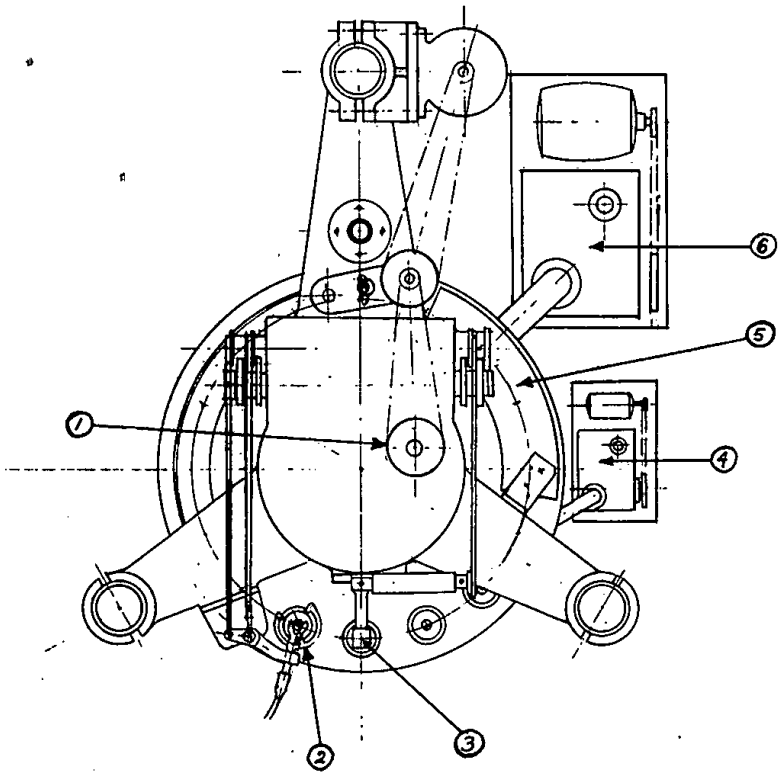
50X1-HUM

SECRET

page 11

1 - Driving Cam
2 - 3-Nozzle Gas Burner
3 - Tube Ejecting Arm
4 - Low Vacuum Pump for Test Position
5 - Oven for Initial Heating
6 - Low Vacuum Pump for all Stages



Modified Exhaust Machine (Top View)

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page 13

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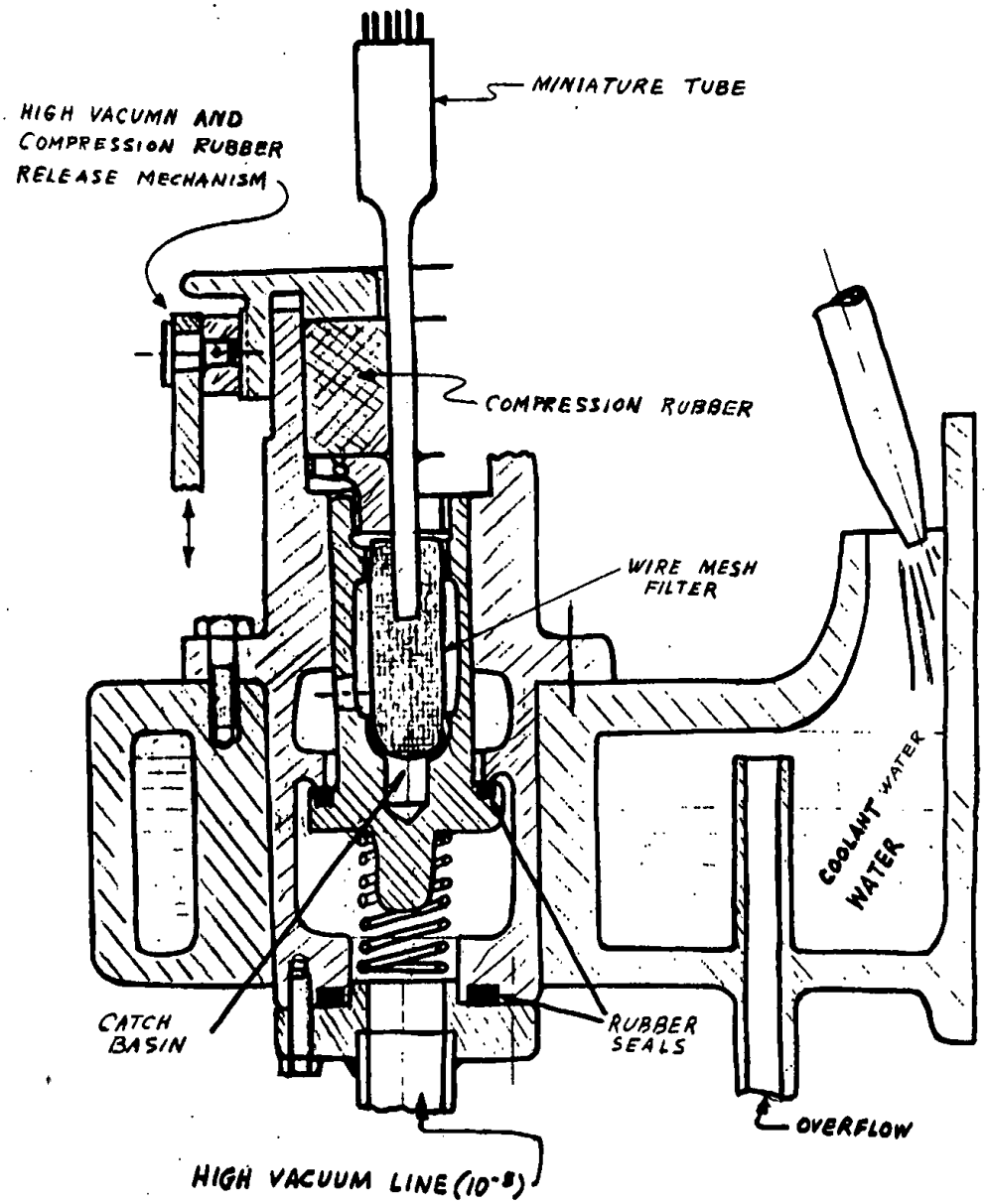

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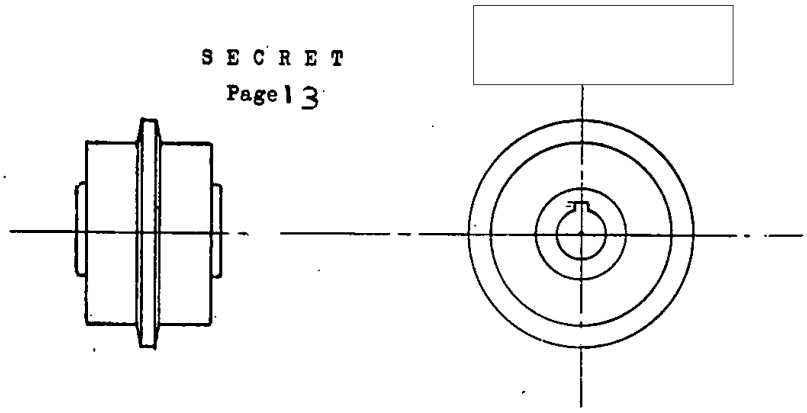

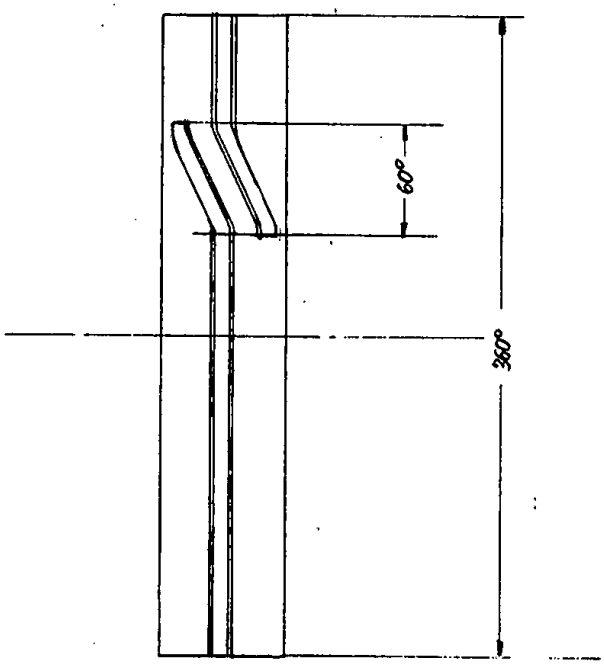

Driving Cam For 16-Stage Exhaust Machine